

Research Note

FRUIT INHIBITION IN *QUERCUS* SPECIES USING GROWTH REGULATORS

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Currently, ethephon is registered in California to eliminate fruit set on ornamental trees and shrubs. Olive Stop (naphthaleneacetic acid, or NAA) is also currently registered in California on olives for fruit suppression when sprayed during the flowering period. This study was conducted to evaluate the efficacy of ethephon and Olive Stop in the suppression of acorn production and to evaluate the impact that these growth regulators may have on the evergreen foliage of southern live oak, *Quercus virginiana*.

For this study, full-skirted (branched to the ground) mature southern live oaks were used. The trees were grown as a screen planting along a busy roadway in Fresno, California. Sections of trees were flagged as treatment sites. The treatment sites consisted of 4-ft-diameter sections of foliage, with treatments assigned according to a randomized complete block design. Each treatment was replicated 7 times with 1 replicate per tree. The trees were treated on April 27, 1995, when the female flowers were at full bloom on the south side of the tree, and the male catkins had fully expanded and were releasing pollen. The treatments were ethephon at 30 oz/10 gal; Olive Stop at 2.5 oz/10 gal; and Olive Stop at 4.0 oz/10 gal. All treatments were tank mixed with 0.8 oz of a non-ionic wetting agent (X-77)/10 gal. Untreated control plants were also evaluated. Growth regulator treatments were applied using a CO₂ pressurized sprayer set at 40 psi. To ensure uniform application over the designated treatment area, a hollow cone nozzle was used and the materials were applied only to thoroughly wet the flowers with no runoff.

The first evaluation was made May 23, 1995 (1 month after treatment), to determine the im-

part of the treatments on the quality of the leaves and to count the number of developing acorns in the treated area. A second foliage evaluation was made 3 months after the initial treatment, on July 10, 1995, to document any change in leaf quality or recovery from treatment injury.

Leaf quality was rated using a 1–5 rating scale, as shown in Table 1.

Table 1. Rating scale for leaf quality evaluation.

| Rating scale | Comment |
|--------------|---|
| 1 | Leaves and twigs dead |
| 2 | Leaves yellowed, large necrotic areas, some to severe leaf drop, and severe epinasty of remaining foliage |
| 3 | Moderate epinasty of the foliage, moderate leaf necrosis, and slight leaf drop |
| 4 | Only minor cupping of the leaves, no cupping or necrosis associated with treatment, and no leaf drop observed |
| 5 | No yellowing, no leaf drop, no cupping or necrosis associated with treatment, and good leaf color appropriate for the species |

To evaluate fruit elimination, developing acorns were counted inside the 4-ft-diameter area. All data in this trial were subjected to analysis of variance and LSD test. There were no significant differences in the means of the acorn counts from the growth regulator treatments, but a highly significant difference between the treatments and the control trees was observed. All growth regulator treatments were highly effective in preventing acorn set (Table 2).

What is more significant and essentially precludes the use of Olive Stop for preventing fruit set on oaks is the degree of injury observed and the lack of recovery in quality of the Olive Stop-treated foliage over time (Table 3). Ethephon, on

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Table 2. Comparison of number of acorns in treated area 1 month after application of fruit suppression growth regulator.

| Treatment | Rate/10 gal | Mean number of fruit in 4-ft-diameter treated area | |
|-------------------|-------------|--|----|
| Control | — | 79.43 | A* |
| Florel (ethephon) | 30.0 oz | 1.00 | B |
| Olive Stop (NAA) | 4.0 oz. | 0.71 | B |
| Olive Stop (NAA) | 2.5 oz | 3.71 | B |

*Means followed by the same letter are not significantly different at 5% (DMRT).

Table 3. Comparison of foliar injury and recovery of southern live oak after treatments of fruit suppression growth regulators.

| Treatment | Rate/10 gal | Foliage injury rating | |
|-------------------|-------------|-----------------------|---------|
| | | 5/23/95 | 7/10/95 |
| Control | — | 5.00 A* | 5.00 A |
| Florel (ethephon) | 30.0 oz | 4.07 AB | 4.64 A |
| Olive Stop (NAA) | 4.0 oz. | 3.28 B | 3.86 B |
| Olive Stop (NAA) | 2.5 oz | 2.14 C | 2.57 C |

*Means followed by the same letter are not significantly different at 5% (DMRT).

the other hand, caused only minor cupping and yellowing, and the treated area recovered over time to the same degree but not equal to the foliar quality of the control. Olive Stop at the low rate caused some damage to the foliage shortly after treatment, but the damage was not significantly worse than the ethephon treatments. However, the Olive Stop treatments, at both the low and the high rates, failed to show recovery over the evaluation period. Olive Stop at the high rate caused very severe injury to the foliage and small twigs, including some shoot death, making its use at this rate totally unacceptable.

In summary, ethephon at the label rate showed excellent reduction in acorn set with minimal injury to the foliage. Olive Stop at both the low and high rates prevented fruit set, but significant injury to the foliage was observed, thereby precluding its widespread use on evergreen oak species.

Literature Cited

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